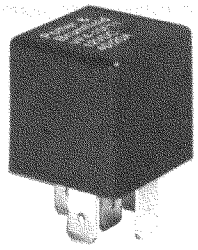


VF4 series

40 AMP RELAY WITH PC BOARD OR QUICK CONNECT TERMINALS

FEATURES

- 40A continuous contact rating @ 85°C.
- 1 Form A and 1 Form C arrangements.
- Plug-in or PC board terminals.
- Optional mounting bracket.
- Various enclosure options.

CONDITIONS

All parametric, environmental and life tests are performed according to EIA Standard RS-407-A at standard test conditions (23°C Ambient, 20-50% RH, 29.5 ± 1.0" Hg.) unless otherwise noted.

CONTACT DATA

Arrangements: 1 Form A (SPST-NO) and 1 Form C (SPDT).
Material: AgNi 0.15 (consult factory for other contact materials).
Max. Switching Rate: 20 operations per second with no contact load.
6 operations per minute for rated life at rated load.
Max. Switching Voltage: 75VDC(1).
Max. Load Current (@ 14VDC Load Voltage):

Load	Form A (NO)	Form C NO	Form C NC
Max. Continuous Current	**60A**	**60A**	**40A**
Max. Make Current(2)	**120A**	**120A**	**45A**
Max. Break Current(1)	**60A**	**60A**	**40A**

Max. Switching Power: 50-500 watts DC (voltage dependent)(1).
Min. Recommended Current: 1 amp @ 12VDC.
Initial Voltage Drop: 200 millivolts, maximum, for normally open contacts @ 40 amp contact load.
250 millivolts, maximum, for normally closed contacts @ 30 amp contact load.
Expected Life: 10 million operations, mechanical; 100,000 operations at 40 amps, 14VDC, resistive load on normally open contact.

INITIAL DIELECTRIC STRENGTH

Between Contacts and Coil: 500V rms.

COIL DATA

Voltage: 6, 12 and 24VDC.
Resistance: See Coil Data table.
Nom. Power: (@ 23°C coil temp. and rated coil voltage.):
1.6W, unsuppressed.
1.81W, with 680 ohm resistor.
Thermal Resistance: 50°C per actual coil watt in still air with no contact load current.

OPERATE DATA

Must Operate and Must Release Voltage: See Coil Data table.
Initial Operate Time: 7 milliseconds, typical, with rated coil voltage applied.
Initial Release Time: 2 milliseconds, typical, with zero volts applied (for unsuppressed relays after having been energized at rated coil voltage.)

ENVIRONMENTAL DATA

Temperature Range: Storage: -40°C to +155°C.
Operating: -40°C to +125°C(4).
Shock: 20 g, 11 milliseconds, half sine wave pulse.
Vibration: (For NC contacts, NO contacts are significantly higher.)
10-40 Hz., 1.27 mm double amplitude.
40-70 Hz., 5 g's constant.
70-100 Hz., 0.5 mm double amplitude.
100-500 Hz., 10 g's constant.
Drop Test: Capable of meeting specifications after a 3.28 foot (1.0 meter) drop onto concrete.
Flammability: UL94-VO external; UL94-HB or better, internal parts (meets FMVSS 302).

MECHANICAL DATA

Termination: 0.250" quick connect and printed circuit terminals.
Enclosures:
Dust Cover: Protects relay from dust. For use in passenger compartment or enclosures.
Shrouded Dust Cover: Protects relay and relay connector (order separately) from dust and splash.
Weatherproof Cover: Mates with a connector (order separately) to seal relay from salt spray etc. Recommended for under hood application.
Ultrasonic Welded Cover: Protects relay from dust. For use in passenger compartment or enclosures.
Cover Retention: Dust cover will withstand a 33.7 pound (150 Newton) force (axially applied) without detachment. Ultrasonic cover: 50 pound (220 Newton).
Weight: 31 g (1.1 oz.) approximately (dust cover model).

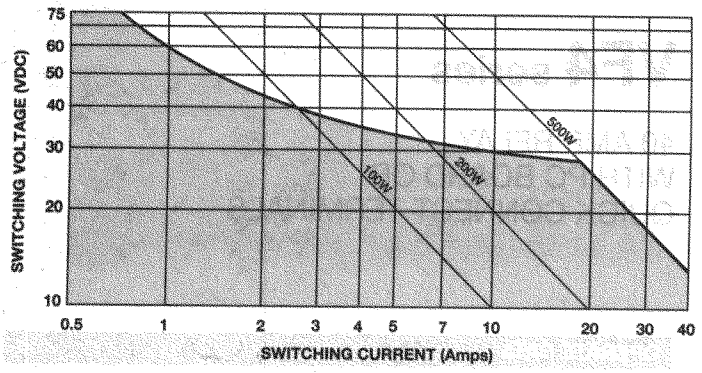
NOTES:

(1) See Figure 1.
(2) Inrush current for lamp load.
(3) Allowable overdrive is rated at ambient temperature for 23°C or 85°C as stated with no load current flowing through the relay contacts and minimum coil resistance. Also see Figure 2 for maximum ambient temperature versus applied coil voltage.
(4) See Figure 2.

COIL DATA (@ 23 C Coil Temperature)

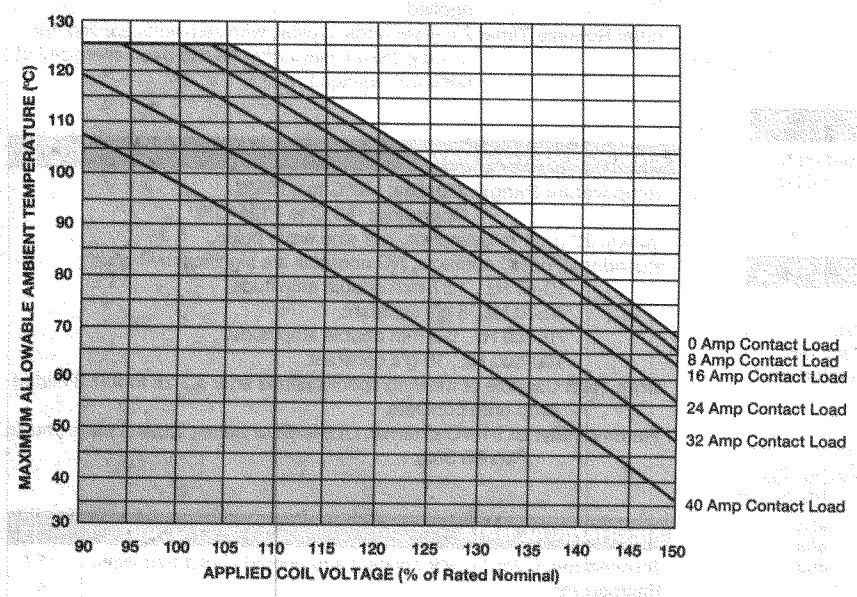
Coil Designator	Rated Coil Voltage (VDC)	Coil Resistance ±10% (Ohms)	Must-Operate Voltage (VDC)	Must-Release Voltage (VDC)	Allowable(3) Overdrive (VDC) @ 23°C	Allowable(3) Overdrive (VDC) @ 85°C
D	6	22.5	3.6	0.6	10.1	7.9
F	12	90	7.2	1.2	20.2	15.7
H	24	360	14.4	2.4	40.5	31.5

FIGURE 1 – LIMITING CURVE FOR POWER LOAD



Safe breaking, arc extinguished (normally open contact) for resistive loads.

FIGURE 2 – AMBIENT TEMPERATURE VERSUS COIL VOLTAGE FOR CONTINUOUS DUTY



Assumptions:

1. Thermal resistance = 50°C per watt
2. Still air
3. Nominal coil resistance
4. Maximum mean coil temperature = 180°C
5. Coil temperature rise due to load
   = 2°C @ 8 amps
   = 5°C @ 16 amps
   = 11°C @ 24 amps
   = 20°C @ 32 amps
   = 32°C @ 40 amps
6. Thermal resistance and power dissipation based on coil resistance at 180°C
7. Curves are based on 1.6 watts at 23°C
8. When full lifetime is at high ambient and high load current, subtract 25°C from maximum allowable ambient temperature.

ORDERING INFORMATION

Part Number	Contact Arrangement	Enclosure	Terminals
VF4-11_*_11	1 Form A	Dust cover	Quick connect
VF4-11_*_13	1 Form A	Dust cover	Printed circuit
VF4-15_*_11	1 Form C	Dust cover	Quick connect
VF4-15_*_13	1 Form C	Dust cover	Printed circuit
VF4-21_*_11	1 Form A	Shrouded dust cover	Quick connect
VF4-41_*_11	1 Form A	Dust cover with bracket	Quick connect
VF4-45_*_11	1 Form C	Dust cover with bracket	Quick connect
VF4-51_*_11	1 Form A	Shrouded dust cover with bracket	Quick connect
VF4-55_*_11	1 Form C	Shrouded dust cover with bracket	Quick connect
VF4-61_*_11	1 Form A	Weatherproof cover with bracket	Quick connect
VF4-65_*_11	1 Form C	Weatherproof cover with bracket	Quick connect
VF4-71_*_11	1 Form A	Ultrasonic welded dust cover	Quick connect
VF4-71_*_13	1 Form A	Ultrasonic welded dust cover	Printed circuit
VF4-75_*_11	1 Form C	Ultrasonic welded dust cover	Quick connect
VF4-75_*_12	1 Form A	Ultrasonic welded dust cover	Printed circuit (clinch)
VF4-75_*_13	1 Form C	Ultrasonic welded dust cover	Printed circuit
VF4-81_*_11	1 Form A	Ultrasonic welded dust cover dust cover with molded bracket	Quick connect
VF4-85_*_11	1 Form C	Ultrasonic welded dust cover dust cover with molded bracket	Quick connect

*Standard Coil Voltages:
D = 6VDC (Consult factory for availability).
F = 12VDC
H = 24VDC (Consult factory for availability).

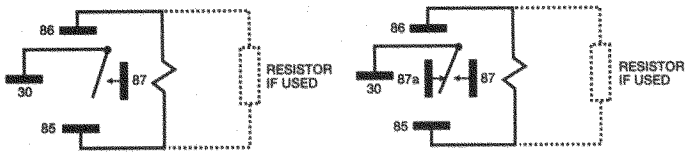
OPTIONAL COIL SUPPRESSION

Add suffix -S07 for 180 ohm resistor in parallel with 6VDC coil.
Add suffix -S01 for 680 ohm resistor in parallel with 12VDC coil.
Add suffix -S08 for 2,700 ohm resistor in parallel with 24VDC coil.

STOCK ITEMS – (The following VF4 series part numbers are normally maintained in stock for immediate delivery:)

VF4-11F11	VF4-15F11-S01	VF4-41F11	VF4-55F11-S01	VF4-75F11-S01	VF4-81F11
VF4-11F13	VF4-15F13	VF4-45F11	VF4-65F11	VF4-75F12	VF4-85F11
VF4-15F11	VF4-15H11	VF4-45F21	VF4-75F11	VF4-75F13	

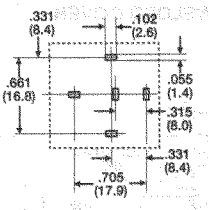
WIRING DIAGRAMS (Bottom View)



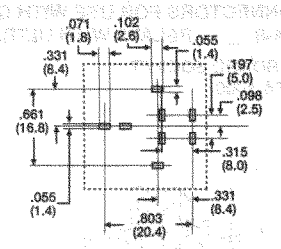
1 FORM A

1 FORM C

SUGGESTED PC BOARD LAYOUTS (Bottom View)



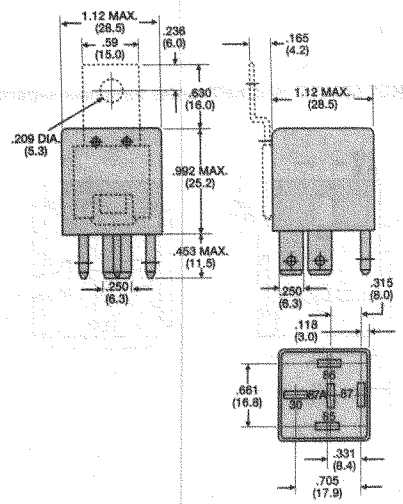
VF4-XXX13



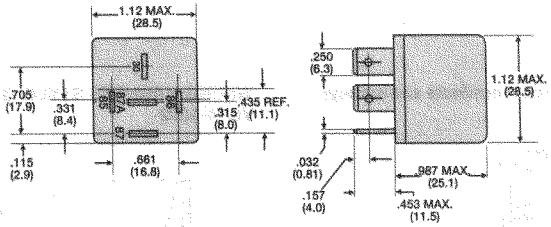
VF4-XXX12

OUTLINE DIMENSIONS

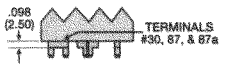
DUST COVER WITH QUICK CONNECT TERMINALS VF4-1_ _ _ & VF4-4_ _ _



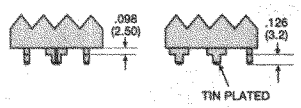
ULTRASONIC WELDED COVER WITH QUICK CONNECT TERMINALS VF4-7_ _ _



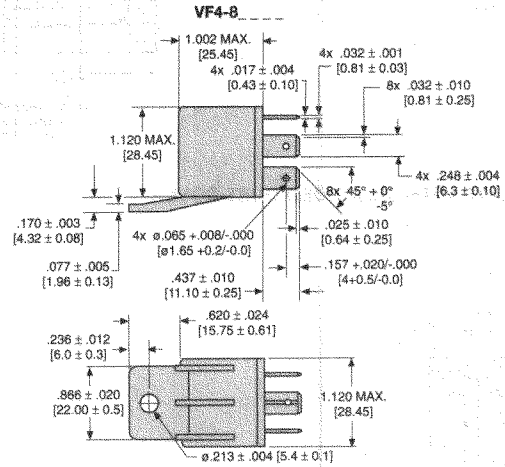
PRINTED CIRCUIT BOARD TERMINALS CLINCHABLE POWER



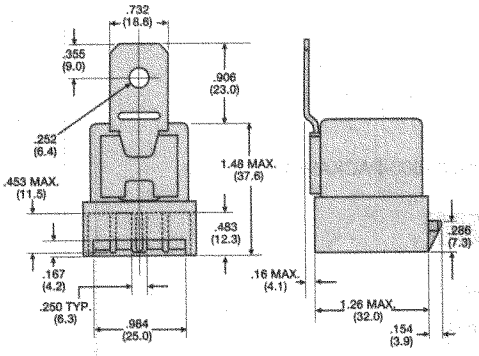
SINGLE PIN

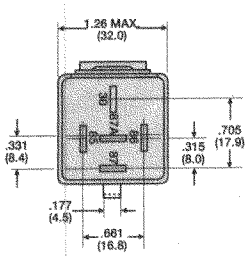


ULTRASONIC WELDED COVER WITH QUICK CONNECT TERMINALS VF4-8_ _ _

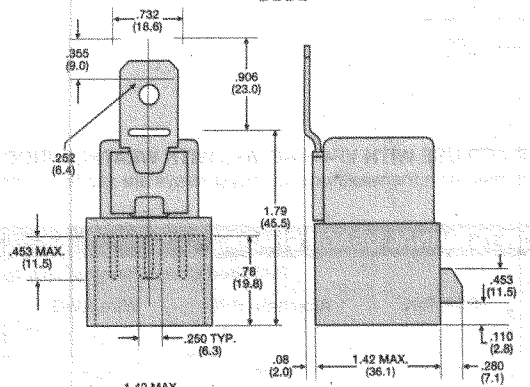


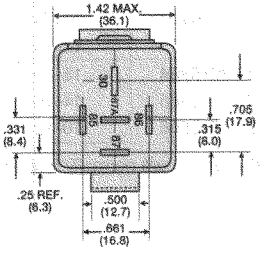
SHROUDED DUST COVER WITH QUICK CONNECT TERMINALS VF4-5_ _ _





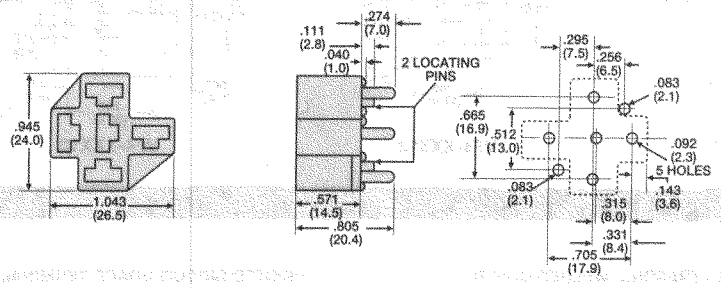
WEATHERPROOF COVER WITH QUICK CONNECT TERMINALS VF4-6_ _ _



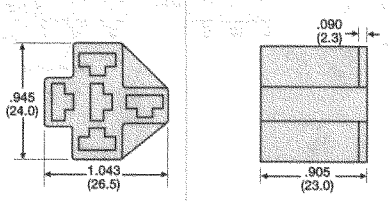


CONNECTORS FOR USE WITH QUICK CONNECT TERMINAL VF4-1_ _ _ _ AND VF4-4_ _ _ _ RELAYS WITH DUST COVER OR VF4-7_ _ _ _ AND VF4-8_ _ _ _ RELAYS WITH ULTRASONIC WELDED COVER

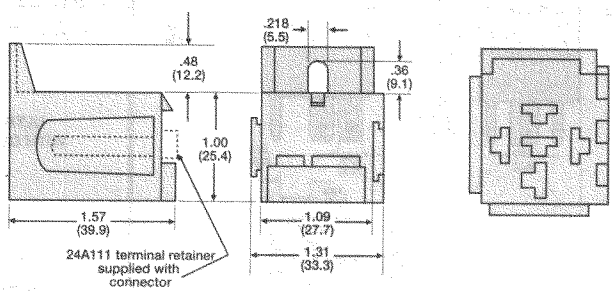
PC BOARD SOCKET
VCF4-1000



WIRING HARNESS STYLE CONNECTOR (order terminals separately)
VCF4-1001

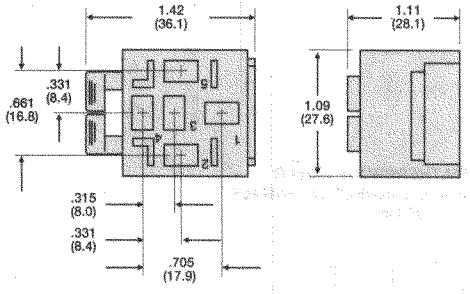


WIRING HARNESS STYLE, BRACKET MOUNT SOCKET (order terminals separately)
VCF4-1002



CONNECTOR FOR USE WITH VF4-5 RELAYS WITH SHROUDED DUST COVER

VCF4-1003
(for VF4 relays with shrouded dust cover)



CONNECTOR FOR USE WITH VF4-6 RELAYS WITH WEATHERPROOF COVER

Connectors to mate with the weatherproof cover relays are available from Packard Electric (1-800-PACKARD).

CONNECTOR/TERMINAL USAGE CHART

Connector	P&B P/N	Required Crimp Terminals (Order Separately)			
		Alternate P/N	Wire AWG	Qty. Required	
				Form A	Form C
VCF4-1000	None	None	N/A	0	0
VCF4-1001	26A1349A	AMP 60249-1	12-16	4	5
	26A1349B	AMP 42281-1	14-18		
VCF4-1002 VCF4-1003	26A1348A	Packard 12015864	18-20	4	5
	26A1348B	Packard 12015865	14-16		
	26A1348C	Packard 12015866	10-12		

All of the P&B connectors and terminals listed above are normally maintained in stock for immediate delivery.